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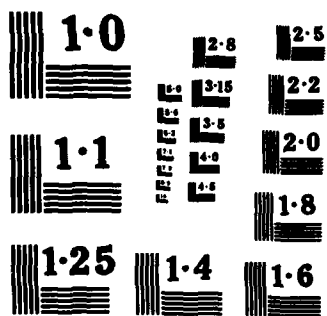
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PROFESSIONAL PAPER 413 / February 1984

NAVAL RESERVE FORCES THROUGHOUT THE WORLD

Aline O. Quester
Anne S. Sicilia

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Aline O. Quester
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Naval Planning and Management Division

CENTER FOR NAVAL ANALYSES

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NAVAL RESERVE FORCES THROUGHOUT THE WORLD

INTRODUCTION

There has been considerable interest recently in how the active/reserve force mix varies across countries. Senator John Warner's office published a set of numbers in early 1983 (see table 1) that generated considerable discussion in both the press and the Congress. It seemed, from these numbers, that the United States was out of step with the prevalent pattern. Our mix of actives to reserves looked considerably richer (and by implication considerably more expensive) than that of other countries. Where most NATO allies had force mixes richer in reserves and the Soviet Union had an active/reserve mix of 1 to 1.4, the United States' active/reserve ratio was 1 to 0.4.

Our initial reaction to these numbers was twofold. First, were the comparisons legitimate: were reserves defined sufficiently similarly across countries so that meaningful comparisons could be constructed? Second, what did Naval active/reserve force mixes look like? Were they similar to the overall patterns?

Comparisons of active and reserve force mixes across countries are complicated by definitional problems. While it is a straightforward task to define active-duty manpower, defining reserve manpower is

TABLE 1

COMPARISONS OF ACTIVE/RESERVE FORCE MIXES ACROSS COUNTRIES:
ALL SERVICES

NATO (1982)

<u>Country</u>	<u>Ratio</u>	<u>Active Number</u>	<u>Reserve Number</u>
Belgium	1 to 1.5	93,500	141,500
Britain	1 to 0.9	327,600	281,700
Canada	1 to 0.3	31,200	153,400
France	1 to 4.9	492,900	457,000
West Germany . .	1 to 1.5	495,000	750,000
Greece	1 to 2.0	206,500	404,000
Italy	1 to 2.2	370,000	799,000
Luxembourg . . .	1 to n.a.	700	n.a.
Netherlands . . .	1 to 1.6	104,000	171,000
Norway	1 to 5.8	42,100	243,000
Portugal	1 to 1.4	66,400	90,000
Spain	1 to 3.1	347,000	1,085,000
Turkey	1 to 1.5	569,000	836,000
United States . .	1 to 0.4	2,116,800	899,600

Warsaw Pact (1982)

Bulgaria	1 to 5.4	148,000	795,000
Czechoslovakia .	1 to 1.7	196,500	325,000
East Germany . .	1 to 1.8	166,000	305,000
Hungary	1 to 1.3	106,000	143,000
Poland	1 to 1.9	317,000	605,000
Rumania	1 to 2.0	181,000	365,000
Soviet Union . .	1 to 1.4	3,705,000	5,000,000

Other European (1982)

Austria	1 to 18.8	49,400	930,000
Ireland	1 to 1.4	16,400	22,200
Finland	1 to 19.0	36,900	700,000
Sweden	1 to 11.4	64,500	735,500
Switzerland . . .	1 to 30.3	20,000	605,000
Yugoslavia . . .	1 to 2.0	250,500	500,000

The Library of Congress produced these numbers for Senator John Warner using reference [1].

considerably more complex. Even within a country, numerous definitions are possible. A narrow definition focuses upon individuals who actively participate in drills or exercises. Other definitions focus on reserves as pre-trained manpower; here the distinction between veterans and reservists is often blurred, with some countries counting all individuals who went through a short, compulsory period of military service as part of their reserve forces.

Indeed, this undefined and uneven metric for counting reservists was the chief motivation behind this paper. Published statistics primarily reflect country-specific definitions of reservists. The United States has many categories of reservists; many other countries have only one. It is perhaps natural to extract from the varied U.S. reservists the group that is the most "ready" and then compare these reservists with the reservists of other countries — natural, but we would argue, quite misleading.

We begin our analysis by outlining the structure of the U.S. Naval Reserve. Throughout we will emphasize that the appropriate reserve end-strength count depends upon the focus. Do we want to know how many inactive Naval personnel the President can mobilize — without new legislation — in time of national emergency? Do we want to assess the stock of pretrained Naval manpower. Or, more narrowly, do we want to focus only on reservists who drill regularly or who know their mobilization assignments?

After describing the U.S. Naval Reserve Force, we turn to the naval reserves of 20 other countries. Here our discussion are more tentative, primarily because our information is still incomplete concerning what constitutes a reserve affiliation in these countries. Finally, we devote more attention to a comparison between British and American naval organization where we find, perhaps surprisingly, comparable reserve/active force mixes.

THE U.S. NAVAL RESERVE

Organization

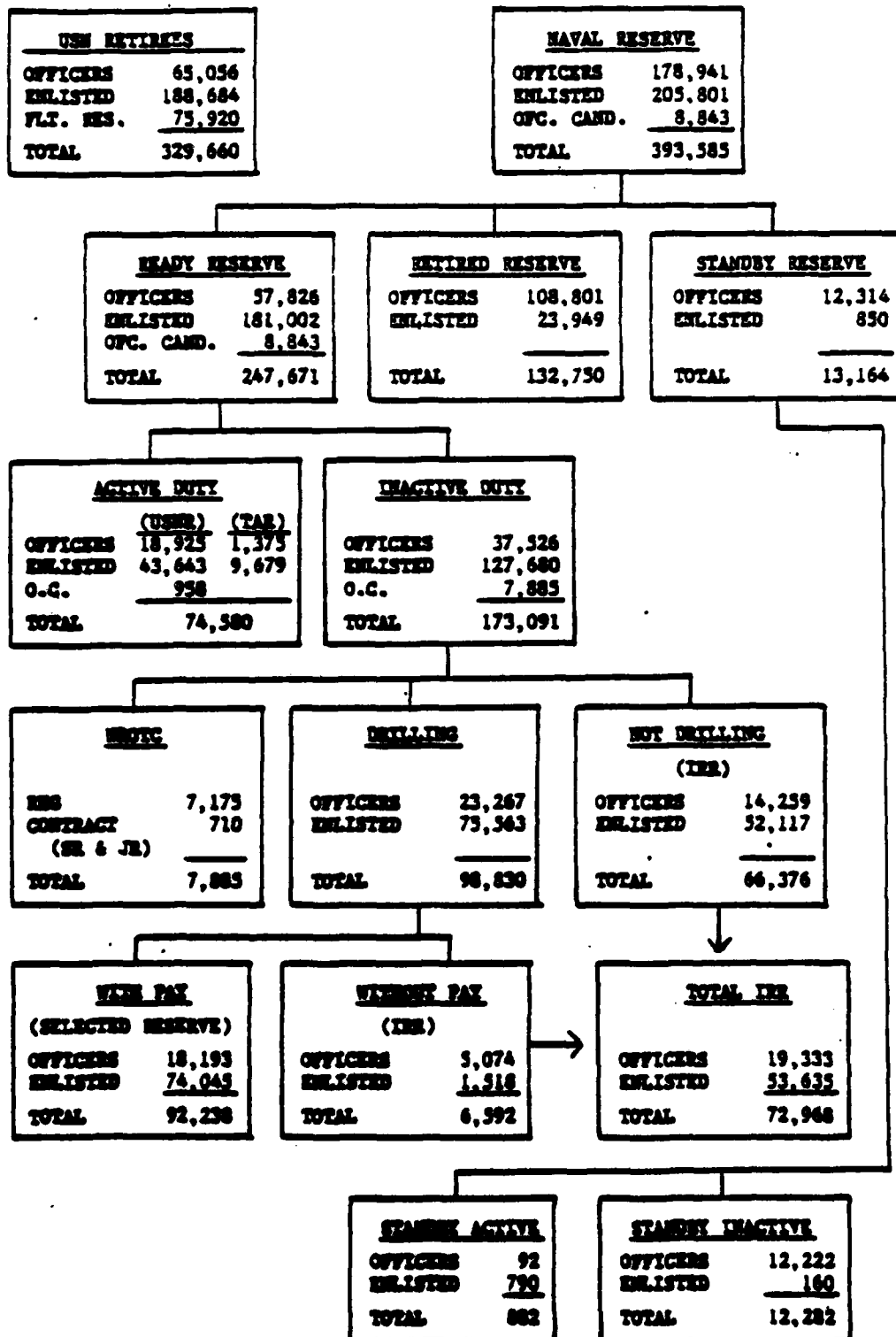
Table 2 shows the organization of the U.S. Naval Reserve and the strengths of its components. It has three main branches: the Ready Reserve* (Individual Ready Reserve (IRR) and Selected Reserve (SELRES)), the Retired Reserve, and the Standby Reserve. There were almost 400,000 Naval Reservists as of 31 May 1983. When the 300,000 USN Retired and Fleet Reservists are added to their number, we obtain what has been called the "Naval Reserve Resources." It totals over 700,000 individuals, a size greater than the active Navy. Pretrained naval manpower in the United States — "Naval Reserve Resources" plus veterans of the active Navy — is even greater, manpower in excess of 1.5 million individuals.

* Additional information can be found in [2]. Naval Military Personnel Command's organizational chart includes the Active Duty USNR (74,580) in the Ready Reserve; this classification is somewhat unusual [3].

TABLE 2

U.S. NAVAL RESERVE RESOURCES OTHER THAN USN ACTIVE DUTY

(As of 31 May 1983)*



In the United States, however, analysts referencing naval reservists usually think about a smaller number of individuals, namely the 92,238 officers and enlisted personnel in the Selected Reserve. These individuals drill one weekend a month as well as participate in a 2-week active duty for training program (ACDUTRA) each summer. Most Navy SELRES drill units will mobilize as a unit, and most are augment units, planned to bring manning from peacetime to wartime levels.

Mobilization Categories

Table 3 provides mobilization information for the U.S. Naval Reserve. Selected Reservists are the easiest to recall: the President can call up to 100,000 of them without declaring war or a national emergency. (To call up the almost 900,000 Selected Reservists in all the services (a full mobilization of SELRES), however, is impossible without declaring a national emergency.)

The Standby and Retired Reserves require a congressional declaration of war or national emergency for involuntary mobilization. Other mobilization assets include retired U.S. Navy personnel. They are not officially part of the Naval Reserve, but, for mobilization purposes, are important. Unfortunately, there is apparently some conflict between the statutes concerning the mobilization status of retired active-duty personnel; see [4].

TABLE 3

MOBILIZATION STATUS BY NAVAL RESERVE CATEGORY

I. Ready Reserve

Up to one million members (all services) can be involuntarily recalled to active duty by the President in time of national emergency. They are required to serve no more than 24 consecutive months (Title 10 USC 673(a) as amended by PL 96-584).

A. Individual Ready Reserve: can be required to perform active duty for training for no more than 14 days annually.

B. Selected Reserve: individuals required to perform at least 48 paid drills and 12-14 days' active duty for training annually.

Up to 100,000 Selected Reservists (all services) can be called to active duty by the President for a period of more than 90 days without a prior declaration of war or national emergency (Section 673b, Title 10, U.S. Code). This procedure is a "recall"; legally, a recall is different from a mobilization.

II. Standby Reserve
and

III. Retired Reserve

Can be involuntarily called to active duty when Congress declares a time of war or national emergency (Title 10, U.S. Code, Section 672(a), 674, and 675.

IV. Fleet Reserve

Fleet Reservists are enlisted personnel (Navy and Marines) who retire with more than 20 years but less than 30 years of active-duty service. They may be involuntarily recalled to active duty in time of war or national emergency declared by Congress or in time of national emergency declared by the President only. It is not clear whether this historical mobilization distinction (the President can call up the Fleet Reserve but it takes Congress to call up USN, retired) is still valid because of provisions in Title 10, USC, 688(a); (see below).

V. Officers, USN Retired

VI. Enlisted, USN Retired

Title 10, USC, 688(a) allows a Service Secretary to call up retired personnel; this section of the Code appears to conflict with section 675 and 672(a), also from Title 10, which requires a congressional declaration of war before retired active-duty personnel can be mobilized.

Fleet Reservists, enlisted "retired" personnel with less than 30 years of service, can be mobilized involuntarily if the President declares a national emergency and thus their mobilization category is similar to that of the Ready Reserves. USN, retired (both officers and enlisted but not Fleet Reservists) appear to require a congressional declaration of war before mobilization, although, as suggested earlier, there is some confusion on this point.

FORCE MIX

Surprisingly, the information necessary for active/reserve naval force comparisons is not readily available in published sources. In fact, the unclassified literature lacks even a current discussion of procurement methods and terms of service for naval personnel in even the world's largest navies.*

To remedy this information gap, we sent a questionnaire to naval attaches in the Washington embassies of the world's 20 largest navies. An example of the information corroboration for Great Britain is reproduced as appendix A. The information we gathered from this questionnaire, as well as published information, is included in table 4.

* For a general discussion of military manpower procurement, see [5].

TABLE 4

CROSS COUNTRY COMPARISONS: ACTIVES AND RESERVES
FOR THE 20 LARGEST NAVIES

Rank	Country	Population (millions)	Volunteer procurement	Initial contract		Active naval manpower (thousands)	Reserve manpower (thousands)	R A R
				Active	Reserve			
1	United States	234.5	Yes	3-6 yrs.	2-6 yrs.	540*	100*	
2	U.S.S.R.	271.8	No	2-3 yrs.	To age 50	400-500	?*	
3	China (PRC)	1008.2	Yes	?	?	180	350*	
4	United Kingdom	55.9	Yes	9 yrs.	3-5 yrs.	65	31	
5	France	54.3	No*	1 yr.	3.5 yrs.	68	64	
6	China (Taiwan)	18.5	No	2 yrs.	On call	38	80	
7	Spain	38.3	No*	15-18 mos.	To age 38	37*	328*	
8	India	723.5	Yes	10-15 yrs.	—	46	—	
9	Brazil	127.7	No*	9 yrs. vol. 1 yr. con.	—	44	—	
10	Turkey	47.0	No	20 mos.	?	45*	70	
11	Japan	119.4	Yes	3 yrs.	?	45	0.6	
12	Italy	57.4	No	18 mos.	On call	42	220	
13	Korea (S)	39.4	No*	3 yrs.	By rank	49	280*	
14	Indonesia	160.0	No	?	—	25-40	*	
15	Argentina	29.0	No	14 mos.	—	33	—	
16	Germany (W)	61.7	No*	15 mos.	?	36	36*	
17	Korea (N)	18.6	No	5 yrs.	?	30-33*	15-40*	
18	Thailand	49.7	No	2 yrs.	—	20-32*	—	
19	Chile	11.6	No*	10 yrs.	To age 45	26	65	
20	Poland	36.5	No	3 yrs.	—	22.5	—	

Notes for Table 4: Population information is from the Military Balance 1983-4 [6]. Unless otherwise noted, other information was provided by the respective embassies in response to our questionnaire. If reference [7] or [6] provides different information, it is noted in the text.

- (1) United States: The number of U.S. Naval Reservists is from [7] and is approximately the number of Selected Reservists. Our discussion in the text illustrates the ambiguity that surrounds definitions of U.S. Naval Reserves, which are comparable to the naval reserve definitions of other countries.
- (2) U.S.S.R.: The information is taken from [7] and [6]. The latter suggests about 75 percent of the active Navy of 450,000 are conscripts. Since all Navy veterans are counted as members of the Navy Reserve until they are 50 years old, there are probably in excess of 1 million Reservists in the U.S.S.R.
- (3) China (PRC): The information is from [7]. The numbers are estimates.
- (4) United Kingdom: [6] lists a slightly larger number of actives (71,727) and the reserves smaller at 37,300. It divides the reserves into Navy Reg and Vol, and Marine Reg and Vol totaling some 32,700.
- (5) France: Reference [7]'s estimate of French naval reserves is somewhat higher, namely 90,000. The 64,000 naval reservists are volunteers who have had active Navy experience. They train two or three times a year. All Frenchmen can be mobilized until age 35.
- (6) China (Taiwan): Both [7] and [6] list slightly smaller numbers of trained reservists (45-60 thousand).
- (7) Spain: The procurement system for the active navy is primarily conscription. Enlisted personnel are in active service for 18 months, in the Temporary Service Forces for 6 months, and then in the Naval Reserve until they are 38 years old. There are 328,200 naval reservists, 15,000 Temporary Service Forces, and 36,900 active navy forces. We have omitted the 15,000 Temporary Service Forces from either the active duty or reserve personnel enumerations. It should be noted, however, that what the Spanish call reserves are more comparable to U.S. veterans and the Temporary Service Forces are more comparable to reserves in the United States. Reference [7] lists 43,800 active Navy personnel and about 190,000 Navy and Marine trained reservists.
- (8) India: The information is from [7] and [6]; neither mentions naval reserves, although the army requires 3-5 years of reserve time after regular duty.

- (9) Brazil: The information is from [7]. There is no mention of naval reserves, reserve tour is required for army, and para-military forces are available. [6] mentions active slightly higher at 49,000.
- (10) Turkey: The information is from [7]; numerical estimates include Marines.
- (11) Japan: The SOF (reserves) must participate in military training for 5 days each year (1 day in the case of those who retired from active service within a year) to prepare for a callout for national defense service.
- (12) Italy: Italian naval reservists would be procured through mobilization and the initial obligation would be as needed. Reference [7] suggests that active Navy and Marine personnel are 42,000 and that Italy has 116,000 men available for rapid mobilization.
- (13) Korea (S): Every male, 18 years or older, has an obligation for military duty. Thus the general procurement scheme is conscription. The Navy and Air Force, however, fill all recruit positions on a volunteer basis. Individuals automatically move from the active Navy to the Homeland Reserve Forces. Reference [7] lists 20,000 active personnel and 30,000-35,000 trained reservists.
- (14) Indonesia: Twenty-five thousand is from [7]. Indonesia has no reserves, but it does have a paramilitary (full-time) force which includes Sea Police, a paranaul force. [6] lists reserves: National Strategic Command HQ only to command Special Reserve forces in strategic operations.
- (15) Argentina: The information is from [7]. No reserves are mentioned for the Navy and the 33,000 active-duty personnel include Marines. [6] lists actives slightly higher at 36,000
- (16) Germany (W): Numbers in the table are from [7]. West Germany has a system of general conscription, but fills some Navy positions with volunteers.
- (17) Korea (N): Reference [7] lists 30,000 active-duty personnel and 15,000 naval reservists. Reference [6] lists 33,000 actives and 40,000 naval reservists.
- (18) Thailand: Reference [7] lists 13,000 active Navy personnel and 7,000 Marines as well as 30,000 trained naval reservists. Reference [6] lists 32,000 active-duty Navy and Marine personnel, but does not mention naval reserves. [1] all men between ages of 21 and 30 are subject to 2 years of military service; about 20 percent actually serve.

- (19) Chile: Procurement for the Active Navy is voluntary; initial obligations last 10 years. Although the main source of reserve procurement is retired naval personnel, it is mandatory for all Chileans (male and female) to apply to the National Military Service upon reaching their 18th birthday. Between the ages of 18 and 30, they may be called for training for a period up to, but not more than, 2 years. Upon completion of this training, they return to civilian life and become Trained Reserves. Those not called to service before their 30th birthday become Untrained Reserves. All Chileans up to the age of 45 years old can be called into Active Service in case of emergency. Reference [1] lists the same number of active-duty personnel but does not mention any naval reserves.
- (20) Poland: The number of active-duty personnel is from [7]; neither it nor [6] mentions naval reserves.

Perhaps the most striking aspect of table 4 is the plethora of comments. Their numbers testify to the formidable definitional problems that surround numerical comparisons of reserves. Abstracting from strategic differences across countries which would suggest different levels of appropriate active/reserve force configurations, the numbers do suggest that the U.S. Navy is at one end of the spectrum. We would argue, however, that the U.S. Naval force mix is closer to that of other countries than the crude numbers themselves suggest. This is primarily because of definitional differences across countries.

For the United States, the personnel counts are those provided in references [7] and [6]; they are counts of the Selected Reserve.* In contrast to the enumeration of drilling reservists in the U.S., Spain's and Italy's enumerations are essentially naval veterans.

Except for the United Kingdom, our information on other countries reserve structures is not complete enough to warrant a detailed examination. We shall examine the U.S./U.K. force mixes in greater detail; first, however, let us turn to some general comments about table 4.

* These numbers are equivalent to those the Library of Congress calculated (for all Services) for Sen. John Warner.

We selected the 20 largest navies by using Jane's Fighting Ships [8] (naval personnel numbers). It may surprise some that Canada, Australia, Mexico, and Sweden are missing; despite large coastal areas and/or large population, they have smaller navies, at least by this criteria.

We defined countries as having voluntary procurement if there was no system of conscription. Countries with conscription, but that stated in their questionnaires that naval enlistments were voluntary, are asterisked. As is clear from the table, most countries rely on conscription to staff their militaries.

Where possible, force level numbers in table 4 are from returned questionnaires. If the embassy did not return the questionnaire (or if published sources suggested different numbers), these are noted at the end of table 4. All entries on table 4 should be examined for possible caveats in the footnotes.

British-United States Comparisons

We devote the most detail to a comparison of the U.S. and British navies. The United States and Britain have the largest free world navies; moreover, both procure personnel by voluntary methods. From that point, however, fairly sharp differences emerge.

Until very recently, the typical enlistment in the British Navy was nine years and began when the recruit was 17 1/2 years old. Since September of 1982, the British have gone to an "Open Engagement" system with new recruits signing up for 22 years (until retirement). The U.S. Navy recruits from 17-19 year olds, but the typical contract is only for 4 years.* Moreover, unlike the U.S., the average British sailor has an obligation with the Royal Fleet Reserve (RFR) after his 9 years of active duty.

In addition to the RFR, Britain has a Royal Naval Reserve (RNR) in which entrance is voluntary. Here initial obligations are 5 years for males and 3 years for females; these periods are renewable by 5 and 3 years, respectively, up to the age of 50. The numbers for British Naval Reservists combine personnel from the Royal Naval Reserve and the Royal Fleet Reserve.

Since the two countries have organized their naval personnel systems so differently, clear parallels are not unambiguous. In table 5, we present several active/reserve force mix ratios, each for a different definition of "naval reserves".

* In the United States initial active-duty Navy contracts vary from 3-6 years; in Britain these contracts vary from 9-12 years. The initial 9-year contracts carry an additional obligation (up to 3 years) in the Royal Fleet Reserve. Twelve-year British obligors have no reserve obligation.

With the Open Engagement system (for entrants since September 1982) recruits with at least after 2.5 years of service may leave the Navy after an 18 months' notice period. This new system will have impact upon the British naval reserve system, but it is premature at this point to try to determine that impact.

TABLE 5

COMPARISONS OF BRITISH AND U.S. ACTIVE/RESERVE FORCE MIXES

Britain (1 Apr. 1982)

Royal Navy	65,200
Naval Reserve (all categories)	31,300
Ratio (active/reserve)	2.08

United States (30 Sept. 1981)

Naval personnel on active duty	540,504
------------------------------------------	---------

Reserve Forces not on active duty

Ready Reserve	186,850
Ratio (Active/Reserve)	2.89

Components:

Selected Reserve	87,599
Individual Ready Reserve	99,251

Naval Reserve	323,271
Ratio (active/reserve)	1.67

Components:

Ready Reserve	186,850
Standby Reserve	20,036
Retired Reserve	116,385

Naval Reserve Resources	652,931
Ratio (active/reserve)83

Components:

Naval Reserve	323,271
Fleet Reserve*	75,920
USN, Retired*	253,740

Definition of U.S. reserves most parallel to British . .	262,770
Ratio (active/reserve)	2.06

Components:

Ready Reserve	186,850
Fleet Reserve	75,920

* The numbers for Fleet Reserve and USN, Retired, are from May 1983 (see table 1). The source for the other data is reference [9].

Initially, we follow the basic U.S. reserve classification scheme but, as we believe this scheme is misleading for U.K./U.S. comparisons, we conclude with a definition of U.S. "Naval Reserves" that does not follow the usual taxonomy. It is this latter definition, however, that we feel most closely parallels the British definition of naval reservists.

We only have one definition of British Naval Reserves, and thus the ratio of active to reserve naval personnel in Britain is quite clear. Our best guess about which U.S. Naval reservists are comparable to the British Naval Reserve is the total of individuals in the Fleet Reserve and the Ready Reserve; totaling these personnel gives an active/reserve force mix of 2.06, a number quite close to the British ratio of 2.08.

The U.S. Navy's Fleet Reserve, as in Britain, is "a pool of trained and experienced personnel who could support the active Navy in an emergency without significant pretraining" [10]. In the United States, however, Fleet Reservists have had at least 20 years of active-duty experience as opposed to the 9 years of service for British Fleet Reservists. Another group of U.S. naval reservists similar to the British Royal Fleet Reserve is the United States' Individual Ready Reserve*: both programs involve a short period of Reserve service after release from active duty and both emphasize the concept of a stock of pretrained

* Individual Ready Reservists are primarily veterans who have completed less than 6 years of active duty.

manpower. For mobilization purposes the Ready Reserve and the Fleet Reserve are similar: both can be mobilized without congressional consent. In short, they are the easiest groups for the President to mobilize in a national emergency. Moreover, both groups are pretrained and have recent active duty experience.

Table 5, however, presents several definitions of U.S. naval reservists. Each definition generates a corresponding active reserve force mix. These ratios vary widely. Our judgment suggests that the last definition is the most comparable, and this definition yields very similar active/reserve force mixes for the two countries.

As an aside, it is worth noting that the U.S. active-duty personnel structure will generate proportionally more pretrained veterans than will the British. This follows directly from the length of the typical first-term contracts in the two countries. In fact, holding other factors constant, the shorter the length of the first-term contract, the greater the numbers of veterans or pretrained manpower that is produced. Some individuals in the veteran pool are also in some form of the reserves; most, however, are not. It would take new legislation to mobilize veterans who are not part of the reserve system. Still, this pool of experienced Navy manpower should not be overlooked.

SUMMARY AND CONCLUSIONS

After ^{looking} ~~a look~~ at the components of the U.S. Naval Reserve, ~~we~~ ^{the authors} attempted to make comparisons of active/reserve force mixes among the U.S. and other countries with large navies. These comparisons are very difficult, ^{since} ~~They are hampered first~~ by a paucity of information. ~~Second~~ ^{and}, even when information is relatively complete, ^{as it is in the British and the United States}, dissimilar organizational structures run the risk of an ^{apples to oranges} ~~comparisons~~. *This study*

Our look ^{suggests} that the U.S. Navy has a richer mix of active to reserves than do other countries with large navies. However, this finding may be caused by definitional problems: other countries classify broader categories of individuals as reservists than does the United States. In fact, ^(their) ~~our~~ closer look at the British Navy suggested that the active/reserve force mix was roughly comparable to that of the United States. *They conclude*

To do more meaningful comparisons across countries of active/reserve forces involves a larger collection of information. Such an effort would be worthwhile. Until then, we would recommend that considerable caution be exercised in any active/reserve force mix comparisons across countries.

REFERENCES

- [1] The International Institute for Strategic Studies. The Military Balance 1982-1983. London: The International Institute for Strategic Studies, 1982
- [2] Gordon, Sol, editor, Reserve Forces Almanac. Washington: Uniformed Services Almanac, Inc., 1982.
- [3] Naval Military Personnel Command, NMPC-92C, Unclassified, "Naval Reserve Officer and Enlisted Strength Report (U)," 27 July 1983
- [4] Bolton, William L. CAPT (USNR), "Mobilization of Guard and Reserve Forces and the Legal System," paper prepared for National Defense University colloquium on Guard and Reserve Mobilization, National Defense University, 1-4 Nov 1983
- [5] CNA Memorandum 81-1458, "Military Manpower Policies: A Comparison of Western Allies (U)," by Ellen Balis, Unclassified, 14 September 1981
- [6] The International Institute for Strategic Studies. The Military Balance 1983-84. London: The International Institute for Strategic Studies, 1983
- [7] Hammerman, Gay, editor. The Almanac of World Military Power. San Rafael, California: Presidio Press, 1980
- [8] Jane's Fighting Ships 1981-82. Captain John Moore, RN, editor. London: Jane's Publishing Company, 1981
- [9] Personnel Statistics Office, Naval Military Personnel Command, NAVPERS 15658(A), (U), FY-81 Annual Report Navy Military Personnel Statistics (U)," Unclassified, 30 Sept 1981
- [10] Office of the Commander British Navy Staff and British Naval Attache, Washington DC, ltr from Commander I.P. Somerville, Royal Navy, Unclassified, 1 June 1983.

APPENDIX A
EXAMPLE OF SURVEY

(United Kingdom)

CENTER FOR NAVAL ANALYSES

2000 North Beauregard Street, Post Office Box 11280, Alexandria, Virginia 22311 (703) 998-3600



4 May 1983

Rear Admiral P.S. Symon
Office of the Naval Attache
P.O. Box 4855
Washington, D.C. 20008

The purpose of this letter is to corroborate the information shown on the attached page on your nation's naval reserve forces. The information will be used as part of a Center for Naval Analyses project comparing Naval Reserves for nations with an Active Navy of at least 20,000 individuals. The paper will be unclassified.

In order to meet our deadline, it would be most helpful if you could respond to this request not later than 1 June 1983. Any additional information on the structure of Active/Reserve forces that you would consider helpful would be appreciated. (In fact, you may note that some basic information is missing on the attached sheet; if published unclassified sources disagreed, we left the entry blank.) I would be happy to discuss the study further with you, and can be reached at 998-3660. If you would like a copy of the paper, please indicate on the attached page.

Thank you in advance for your attention.

Sincerely,

Anne S. Sicilia

AS/bh
Encl.

United Kingdom (British)

NAVAL FORCES INFORMATION

	<u>Active Navy</u>	<u>Naval Reserves</u>
Method of procurement	Voluntary	Voluntary
Initial obligation		Remainder of active time, if early release is opted
Size of force	71.5 thousand	28.0 thousand

General Information: To gain flexibility and attract recruits, early release is offered, provided service is 3 years total.

Note: It would be especially helpful if you could provide more detail on the nature of the Reserve obligation.

Comments:

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CNA PROFESSIONAL PAPERS - 1978 TO PRESENT

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Mizrahi, Maurice M., "On Approximating the Circular Coverage Function," 14 pp., Feb 1978, AD A054 429
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Mangel, Marc, "On Singular Characteristic Initial Value Problems with Unique Solution," 20 pp., Jun 1978, AD A056 535
- PP 213
Mangel, Marc, "Fluctuations in Systems with Multiple Steady States, Application to Lanchester Equations," 12 pp., Feb 78 (Presented at the First Annual Workshop on the Information Linkage Between Applied Mathematics and Industry, Naval PG School, 23-25 Feb 1978), AD A071 472
- PP 214
Weinland, Robert G., "A Somewhat Different View of The Optimal Naval Posture," 37 pp., Jun 1978 (Presented at the 1976 Convention of the American Political Science Association (APSA) Panel on "Changing Strategic Requirements and Military Posture", Chicago, Ill., 2 Sep 1976), AD A056 228
- PP 215
Colle, Russell C., "Comments on: Principles of Information Retrieval by Manfred Kochen," 10 pp., Mar 78 (Published as a Letter to the Editor, Journal of Documentation, Vol. 31, No. 4, Dec 1975), AD A054 426
- PP 216
Colle, Russell C., "Lotka's Frequency Distribution of Scientific Productivity," 18 pp., Feb 1978 (Published in the Journal of the American Society for Information Science, Vol. 28, No. 6, Nov 1977), AD A054 425
- PP 217
Colle, Russell C., "Bibliometric Studies of Scientific Productivity," 17 pp., Mar 78 (Presented at the Annual meeting of the American Society for Information Science held in San Francisco, California, Oct 1976), AD A054 442
- PP 218 - Classified
- PP 219
Huntzinger, R. LaVer, "Market Analysis with Rational Expectations: Theory and Estimation," 60 pp., Apr 78, AD A054 422
- PP 220
Maurer, Donald E., "Diagonalization by Group Matrices," 26 pp., Apr 78, AD A054 443
- PP 221
Weinland, Robert G., "Superpower Naval Diplomacy in the October 1973 Arab-Israeli War," 76 pp., Jun 1978 (Published in Seapower in the Mediterranean: Political Utility and Military Constraints, The Washington Papers No. 61, Beverly Hills and London: Sage Publications, 1979) AD A055 564
- PP 222
Mizrahi, Maurice M., "Correspondence Rules and Path Integrals," 30 pp., Jun 1978 (Invited paper presented at the CNRS meeting on "Mathematical Problems in Feynman's Path Integrals," Marseille, France, 22-26 May 1978. Published in Springer Verlag Lecture Notes in Physics, 106, 1979), AD A055 536
- PP 223
Mangel, Marc, "Stochastic Mechanics of Moleculation Molecule Reactions," 21 pp., Jun 1978, AD A056 227
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Mangel, Marc, "Aggregation, Bifurcation, and Extinction in Exploited Animal Populations," 48 pp., Mar 1978, AD A056 536
"Portions of this work were completed at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, B.C., Canada
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Mangel, Marc, "Oscillations, Fluctuations, and the Hopf Bifurcation," 43 pp., Jun 1978, AD A056 537
"Portions of this work were completed at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, Canada.
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Reiston, J. M., and Mann, J. W., "Temperature and Current Dependence of Degradation in Red-Emitting GaP LEDs," 34 pp., Jun 1978 (Published in Journal of Applied Physics, Vol. 50, May 1979) AD A056 538
"Bell Telephone Laboratories, Inc.
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Mangel, Marc, "Uniform Treatment of Fluctuations at Critical Points," 50 pp., May 1978, AD A056 539
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Mangel, Marc, "Diffusion Theory of Reaction Rates. I: Formulation and Einstein-Smoluchowski Approximation," 50 pp., Jan 1978, AD A056 541
- PP 230
Mangel, Marc, "Diffusion Theory of Reaction Rates. II Ornstein-Uhlenbeck Approximation," 34 pp., Feb 1978, AD A056 542
- PP 231
Wilson, Desmond P., Jr., "Naval Projection Forces: The Case for a Responsive MAF," Aug 1978, AD A056 543
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Jacobson, Louis, "Can Policy Changes Be Made Acceptable to Labor?" 18 pp., Aug 1978 (Submitted for publication in Industrial and Labor Relations Review), AD A061 528

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Mizrahi, Maurice M., "The Semiclassical Expansion of the Anharmonic-Oscillator Propagator," 41 pp., Oct 1978 (Published in Journal of Mathematical Physics, Vol. 20, 1979), AD A061 538
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Maurer, Donald, "A Matrix Criterion for Normal Integral Bases," 10 pp., Jan 1979 (Published in the Illinois Journal of Mathematics, Vol. 22, 1978)
- PP 238
Utgoff, Kathleen Classen, "Unemployment Insurance and The Employment Rate," 20 pp., Oct 1978 (Presented at the Conference on Economic Indicators and Performance: The Current Dilemma Facing Government and Business Leaders, presented by Indiana University Graduate School of Business), AD A061 527
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Trost, R. P., and Warner, J. T., "The Effects of Military Occupational Training on Civilian Earnings: An Income Selectivity Approach," 38 pp., Nov 1979, AD A077 831
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Powers, Bruce, "Goals of the Center for Naval Analyses," 13 pp., Dec 1978, AD A063 799
- PP 241
Mengel, Marc, "Fluctuations at Chemical Instabilities," 12 pp., Dec 1978 (Published in Journal of Chemical Physics, Vol. 69, No. 8, 15 Oct 1978), AD A063 787
- PP 242
Simpson, William R., "The Analysis of Dynamically Interactive Systems (Air Combat by the Numbers)," 160 pp., Dec 1978, AD A063 760
- PP 243
Simpson, William R., "A Probabilistic Formulation of Murphy Dynamics as Applied to the Analysis of Operational Research Problems," 18 pp., Dec 1978, AD A063 761
- PP 244
Sherman, Allen, and Morowitz, Stanley A., "Maintenance Costs of Complex Equipment," 20 pp., Dec 1978 (Published By The American Society of Naval Engineers, Naval Engineers Journal, Vol. 91, No. 6, Dec 1979), AD A071 473
- PP 245
Simpson, William R., "The Accelerometer Methods of Obtaining Aircraft Performance from Flight Test Data (Dynamic Performance Testing)," 403 pp., Jun 1979, AD A079 226
- PP 246
Brechtling, Frank, "Layoffs and Unemployment Insurance," 35 pp., Feb 1979 (Presented at the NBER Conference on "Low Income Labor Markets," Chicago, Jun 1978), AD A096 629
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- PP 251
Trost, Robert P., "The Estimation and Interpretation of Several Selectivity Models," 37 pp., Jun 1979, AD A079 941
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- PP 253
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Mengel, Marc, and Quenbeck, David B., "Integration of a Bivariate Normal Over an Offset Circle," 14 pp., Jun 1979, AD A096 471
- PP 255 - Classified, AD B051 441L
- PP 256
Maurer, Donald E., "Using Personnel Distribution Models," 27 pp., Feb 1980, AD A082 218
- PP 257
Thaler, R., "Discounting and Fiscal Constraints: Why Discounting is Always Right," 10 pp., Aug 1979, AD A075 224
- PP 258
Mengel, Marc S., and Thomas, James A., Jr., "Analytical Methods in Search Theory," 86 pp., Nov 1979, AD A077 832
- PP 259
Glass, David V.; Hsu, In-Ching; Nunn, Walter R.; and Perin, David A., "An Analysis of a Layered Defense Model," 17 pp., Mar 1980, AD A077 833
- PP 260
Mengel, Marc S., and Cope, Davis K., "Detection Rate and Sweep Width in Visual Search," 14 pp., Nov 1979, AD A077 834
- PP 261
Villa, Carlos L.; Zvijac, David J.; and Ross, John, "Frank-Condon Theory of Chemical Dynamics. VI. Angular Distributions of Reaction Products," 14 pp., Nov 1979 (Reprinted from Journal Chemical Phys. 70(12), 15 Jun 1979), AD A076 287
- PP 262
Peterson, Charles C., "Third World Military Elites in Soviet Perspective," 90 pp., Nov 1979, AD A077 835
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Robinson, Kathy L., "Using Commercial Tankers and Container-ships for Navy Underway Replenishment," 25 pp., Nov 1979, AD A077 836

- PP 264
Weinland, Robert G., "The U.S. Navy in the Pacific: Past, Present, and Glimpses of the Future," 31 pp., Nov 1979 (Delivered at the International Symposium on the Sea, sponsored by the International Institute for Strategic Studies, The Brookings Institution and the Yomiuri Shimbun, Tokyo, 16-20 Oct 1978), AD A077 837
- PP 265
Weinland, Robert G., "War and Peace in the North: Some Political Implications of the Changing Military Situation in Northern Europe," 18 pp., Nov 1979 (Prepared for presentation to the Conference of the Nordic Balance in Perspective: The Changing Military and Political Situation," Center for Strategic and International Studies, Georgetown University, 15-16 Jun 1978), AD A077 838
- PP 266
Utgoff, Kathleen Classen, and Brechling, Frank, "Taxes and Inflation," 25 pp., Sep 1979, AD A081 194
- PP 267
Trost, Robert P., and Vogel, Robert C., "The Response of State Government Receipts to Economic Fluctuations and the Allocation of Counter-Cyclical Revenue Sharing Grants," 12 pp., Dec 1979 (Reprinted from the Review of Economics and Statistics, Vol. LXI, No. 3, Aug 1979)
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Thomson, James S., "Seaport Dependence and Inter-State Cooperation: The Case of Sub-Saharan Africa," 141 pp., Jan 1980, AD A081 193
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Weiss, Kenneth G., "The Soviet Involvement in the Ogaden War," 42 pp., Jan 1980 (Presented at the Southern Conference on Slavic Studies in October, 1979), AD A082 219
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Ramek, Richard, "Soviet Policy in the Horn of Africa: The Decision to Intervene," 52 pp., Jan 1980 (To be published in "The Soviet Union in the Third World: Success or Failure," ed. by Robert M. Donaldson, Westview Press, Boulder, Co., Summer 1980), AD A081 195
- PP 271
McConnell, James, "Soviet and American Strategic Doctrines: One More Time," 43 pp., Jan 1980, AD A081 192
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Mangel, Marc, "Small Fluctuations in Systems with Multiple Limit Cycles," 19 pp., Mar 1979 (Published in SIAM J. Appl. Math., Vol. 38, No. 2, Feb 1980), AD A086 229
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Mizrahi, Maurice, "A Targeting Problem: Exact vs. Expected-Value Approaches," 23 pp., Apr 1980, AD A085 096
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- PP 280
Goldberg, Laurence, "Estimation of the Effects of a Ship's Steaming on the Failure Rate of its Equipment: An Application of Econometric Analysis," 25 pp., Apr 1980, AD A085 098
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Mizrahi, Maurice M., "Comment on 'Discretization Problems of Functional Integrals in Phase Space'," 2 pp., May 1980, (Published in "Physical Review D", Vol. 22, No. 8, 15 Oct 1980), AD A094 994
- PP 283
Dismukes, Bradford, "Expected Demand for the U.S. Navy to Serve as An Instrument of U.S. Foreign Policy: Thinking About Political and Military Environmental Factors," 30 pp., Apr 1980, AD A085 099
- PP 284
Kallison, J.; Nunn, W.; and Sumita, U., "The Laguerre Transform," 119 pp., May 1980, AD A085 100
"The Graduate School of Management, University of Rochester and the Center for Naval Analysis
**The Graduate School of Management, University of Rochester
- PP 285
Ramek, Richard B., "Superpower Security Interests in the Indian Ocean Area," 26 pp., Jun 1980, AD A087 113
- PP 286
Mizrahi, Maurice M., "On the MKB Approximation to the Propagator for Arbitrary Hamiltonians," 25 pp., Aug 1980 (Published in Journal of Math. Phys., 22(1) Jan 1981), AD A091 307
- PP 287
Cope, Davis, "Limit Cycle Solutions of Reaction-Diffusion Equations," 319 pp., Jun 1980, AD A087 114
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Gelman, Walter, "Don't Let Your Slides Flip You: A Painless Guide to Visuals That Really Aid," 28 pp., (revised Aug 1982), AD A092 732
- PP 289
Robinson, Jack, "Adequate Classification Guidance - A Solution and a Problem," 7 pp., Aug 1980, AD A091 212
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Watson, Gregory M., "Evaluation of Computer Software in an Operational Environment," 17 pp., Aug 1980, AD A091 213
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Medalis, G. S., and Trost, R. P., "Some Extensions of the Markov Process Model," 17 pp., Oct 1980, AD A091 946
"University of Florida

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Thomas, James A., Jr., "The Transport Properties of Binary Gas Mixtures in Applied Magnetic Fields," 10 pp., Sep 1980 (Published in Journal of Chemical Physics 72(10), 15 May 1980)
- PP 293
Thomas, James A., Jr., "Evaluation of Kinetic Theory Collision Integrals Using the Generalized Phase Shift Approach," 12 pp., Sep 1980 (Printed in Journal of Chemical Physics 72(10), 15 May 1980)
- PP 294
Roberts, Stephen S., "French Naval Policy Outside of Europe," 30 pp., Sep 1980 (Presented at the Conference of the Section on Military Studies, International Studies Association, Kilauea Island, S.C.), AD A091 306
- PP 295
Roberts, Stephen S., "An Indicator of Informal Empire: Patterns of U.S. Navy Cruising on Overseas Stations, 1869-1897," 40 pp., Sep 1980 (Presented at Fourth Naval History Symposium, US Naval Academy, 26 Oct 1979), AD A091 316
- PP 296
Dismukes, Bradford, and Petersen, Charles C., "Maritime Factors Affecting Iberian Security," (Factores Maritimos que Afectan la Seguridad Iberica) 14 pp., Oct 1980, AD A092 733
- PP 297 - Classified
- PP 298
Mizrahi, Maurice M., "A Markov Approach to Large Missile Attacks," 31 pp., Jan 1981, AD A096,199
- PP 299
Jondrow, James M., and Levy, Robert A., "Wage Leadership in Construction," 19 pp., Jan 1981, AD A094 797
- PP 300
Jondrow, James, and Schmidt, Peter, "On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model," 11 pp., Jan 1981, AD A096 160
Michigan State University
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Jondrow, James M.; Levy, Robert A.; and Hughes, Claire, "Technical Change and Employment in Steel, Autos, Aluminum, and Iron Ore," 17 pp., Mar 1981, AD A099 394
- PP 302
Jondrow, James M., and Levy, Robert A., "The Effect of Imports on Employment Under Rational Expectations," 19 pp., Apr 1981, AD A099 392
- PP 303
Thomson, James, "The Rarest Commodity in the Gasling Resource Wars," 3 pp., Aug 1981 (Published in the Washington Star, 13 Apr 1981), AD A104 221
- PP 304
Duffy, Michael K.; Greenwood, Michael J.,^a and McDowell, John M.,^{**} "A Cross-Sectional Model of Annual Interregional Migration and Employment Growth: Intertemporal Evidence of Structural Change, 1958-1975," 31 pp., Apr 1981, AD A099 393
University of Colorado
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Nunn, Laura M., "An Introduction to the Literature of Search Theory," 32 pp., Jun 1981, AD A100 420
- PP 306
Anger, Thomas E., "What Good Are Warfare Models?" 7 pp., May 1981, AD A100 421
- PP 307
Thomson, James, "Dependence, Risk, and Vulnerability," 43 pp., Jun 1981, AD A102 696
- PP 308
Mizrahi, M.M., "Correspondence Rules and Path Integrals," 17 pp., Jul 1981. (Published in "Nuovo Cimento B", Vol. 61, 1981), AD A102 699
- PP 309
Weinland, Robert G., "An (The?) Explanation of the Soviet Invasion of Afghanistan," 44 pp., May 1981, AD A100 422
- PP 310
Stanford, Janette M., and Wu, Tai Te, "A Predictive Method for Determining Possible Three-dimensional Foldings of Immunoglobulin Backbones Around Antibody Combining Sites," 19 pp., Jun 1981 (Published in J. Theor. Biol., 1981), 88, AD A100 423
Northwestern University
- PP 311
Bowes, Marianne, Brechling, Frank P. R.; and Utgoff, Kathleen P. Clessen, "An Evaluation of UI Funes," 13 pp., May 1981 (Published in National Commission on Unemployment Compensation's "Unemployment Compensation: Studies and Research," Volume 2, Jul 1980), AD A100 424
- PP 312
Jondrow, James; Bowes, Marianne; and Levy, Robert, "The Optimum Speed Limit," 23 pp., Jul 1983 (Revised), AD A100 425
- PP 313
Roberts, Stephen S., "The U.S. Navy in the 1980s," 36 pp., Jul 1981, AD A102 696
- PP 314
Jehn, Christopher; Horowitz, Stanley A.; and Lockman, Robert F., "Examining the Draft Debate," 20 pp., Jul 1981, AD A106 192
- PP 315
Buck, Ralph V. (Capt., USN), "Le Catastrophe by any other name....," 4 pp., Jul 1981, AD A102 697
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- PP 318
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- PP 319
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- PP 320
Trost, R. P.; Lurie, Philip; and Berger, Edward, "A Note on Estimating Continuous Time Decision Models," 15 pp., Sep 1981, AD A106 193
- PP 321
Duffy, Michael K., and Ledman, Jerry R., "The Simultaneous Determination of Income and Employment in United States--Mexico Border Region Economies," 34 pp., Sep 1981, AD A106 540
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- PP 327
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- PP 329
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- PP 330
Lochman, Robert F., "Alternative Approaches to Attrition Management," 30 pp., Jan 1982, AD A112 510
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- PP 332
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- PP 333
Lee, Lung-Fel,* and Trost, Robert P., "Estimation of Some Limited Dependent Variable Models with Application to Housing Demand," 26 pp., Jan 1982, (Published in Journal of Econometrics 8 (1978), AD A 112 536
*University of Minnesota
- PP 334
Kenny, Lawrence W.;* Lee, Lung-Fel;** Maddala, G. S.;* and Trost R. P., "Returns to College Education: An Investigation of Self-Selection Bias Based on the Project Talent Data," 15 pp., Jan 1982, (Published in International Economic Review, Vol. 20, No. 3, Oct 1979), AD A112 480
*University of Florida
**University of Minnesota
- PP 335
Lee, Lung-Fel;* Maddala, G. S.;** and Trost, R.P., "Asymptotic Covariance Matrices of Two-Stage Probit and Two-Stage Tobit Methods for Simultaneous Equations Models with Selectivity," 13 pp., Jan 1982, (Published in Econometrica, Vol. 48, No. 2, Mar 1980), AD A112 483
*University of Minnesota
**University of Florida
- PP 336
O'Neill, Thomas, "Mobility Fuels for the Navy," 13 pp., Jan 1982, (Accepted for publication in Naval Institute Proceedings), AD A112 511
- PP 337
Warner, John T., and Goldberg, Matthew S., "The Influence of Non-Pecuniary Factors on Labor Supply: The Case of Navy Enlistment Personnel," 23 pp., Dec 1981, AD A113 094
- PP 338
Feldman, Paul and Jondrow, James, "American Journal of Political Science," 19 pp., Feb 1984
- PP 339
Wilson, Desmond P., "The Persian Gulf and the National Interest," 11 pp., Feb 1982, AD A112 505
- PP 340
Lurie, Philip; Trost, R. P.; and Berger, Edward, "A Method for Analyzing Multiple Spell Duration Data," 34 pp., Feb 1982, AD A112 504
- PP 341
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- PP 342
Lee, Lung-Fel;* Maddala, G. S.;** and Trost, R. P., "Testing for Structural Change by D-Methods in Switching Simultaneous Equations Models," 5 pp., Feb 1982, AD A112 482
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- PP 344
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- PP 345
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"Cornell University"
- PP 346
Roether, Bernard, "Selective Service and the All-Volunteer Force," 23 pp., Mar 1982, AD A113 096
- PP 347
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- PP 348
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- PP 349
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"University of Utah, Dept. of Chemistry"
- PP 350
Levin, Marc, "A Method for Increasing the Firepower of Virginia Class Cruisers," 10 pp., Apr 1982, (To be published in U.S. Naval Institute Proceedings), AD A116 602
- PP 351
Coutre, S. E.; Stanford, J. M.; Davis, J. G.; Stevens, P. W.; and Wu, T. T., "Possible Three-Dimensional Backbone Folding Around Antibody Combining Site of Immunoglobulin MFC 167," 18 pp., Apr 1982 (Published in Journal of Theoretical Biology)
"Northwestern University, Depts. of Biochemistry & Molecular Biology and Engineering Sciences & Applied Mathematics"
- PP 352
Bartlett, C. Bernard, "Aggregation of Conditional Absorbing Markov Chains," 7 pp., Jun 1982 (Presented to the Sixth European Meeting on Cybernetics and Systems Research, held at the University of Vienna, Apr 1982), AD A116 603
- PP 353
Bartlett, C. Bernard, "Some Mathematical Methods for Modeling the Performance of a Distributed Data Base System," 18 pp., Jun 1982, (Presented to the International Working Conference on Model Realism, held at Bad Hainach, West Germany, Apr 1982), AD A116 604
- PP 354
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- PP 356
Cyke, Steven; Goldberg, Matthew S.; Hagan, Paul; and Hairs, Lee; "Estimation of the Personal Discount Rate: Evidence from Military Recruitment Decisions," 19 pp., Apr 1982, AD A122 419
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Goldberg, Matthew S., "Discrimination, Negotiation, and Long-Run Wage Differentials," 13 pp., Sep 1982 (Published in Quarterly Journal of Economics, May 1982)
- PP 358
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Quenbeck, David B., "Methods for Generating Aircraft Trajectories," 51 pp., Sep 1982, AD A122 386
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- PP 363
Marcus, A. J., "Personnel Substitution and Navy Aviation Readiness," 35 pp., Oct 1982, AD A122 420
- PP 364
Quester, Aline, and Nakada, Michael, "The Military's Monopoly Power," 29 pp., Oct 1982, AD A123 657
- PP 365
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- PP 366
Spruill, Nancy L., and Gestwirth, Joseph L., "On the Estimation of the Correlation Coefficient From Grouped Data," 9 pp., Oct 1982, (Published in the Journal of the American Statistical Association, Sep 1982, Vol. 77, No. 379, Theory and Methods Section), AD A122 382
"George Washington University, Dept. of Statistics"
- PP 367
Peterson, Charles C., "Soviet Tactics for Warfare at Sea (Two Decades of Upheaval)," 57 pp., Nov 1982
- PP 368
Weinland, Robert G., "The Evolution of Soviet Requirements for Naval Forces--Solving the Problems of the Early 1960s," 41 pp., Dec 1982, AD A123 655
- PP 369
Quester, Aline, and Lockman, Robert, "The All-Volunteer Force: A Positive Perspective," 29 pp., Nov 1982, AD A128 279
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Jacobson, Louis, "Research to Quantify the Effect of Permanent Change of Station Moves on Wives' Wages and Labor Supply," 35 pp., Jan 1983, AD A128 300
- PP 374
Clay-Randee, Deborah, and Balis, Ellen, "Balancing Accession and Retention: The Disaggregate Model," 27 pp., Aug 1982

- PP 375
Feldman, Paul, "Privatizing Airports in Washington, D.C.," 17 pp., Feb. 1983, AD A128 236
- PP 376
Weiss, Kenneth G., "Power Grows Out of the Barrel of a Gunboat: The U.S. in Sino-Soviet Crises," 136 pp., Dec 1982
- PP 377
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- PP 379
Jondrow, James M.; Chase, David E.; and Gamble, Christopher L., "The Price Differential Between Domestic and Imported Steel," 17 pp., May 1983
- PP 380
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Thomas, James A., Jr. and Mangel, Marc, "Properties of Quick Look Passive Localization," 39 pp., Jul 1983
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Goldberg, Matthew S., and Mager, Michael F., "A Comparison of the Prophet and ACOG Force Projection Models," 35 pp., Jun 1981
- PP 385
Angier, Bruce; Driscoll, Kurt; and Gregory, David, "Manpower Requirements Derivation for the Navy Comprehensive Compensation and Supply Study," 22 pp., Sep 1982
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